

WHAT IS CLAIMED IS:

- 1 A lead frame comprising:
a frame; and
- 5 a plurality of inner leads extending inward from the frame,
wherein each of the inner leads includes a protruded portion provided
on a surface of an external side portion thereof, the protruded portion being
protruded in a thickness direction.
- 10 2. The lead frame according to claim 1, wherein a thickness of the
protruded portion of each inner lead is substantially equal to a thickness of
the frame.
- 15 3. The lead frame according to claim 1, wherein an insulation tape is
stuck on a surface of each protruded portion so that the protruded portion is
supported by the insulation tape.
- 20 4. A resin-encapsulated semiconductor device comprising:
a semiconductor chip on a surface of which a group of electrodes is
provided;
a plurality of inner leads arranged along a periphery of the
semiconductor chip;
connecting members for connecting the electrodes of the
semiconductor chip with the respective inner leads;
- 25 an encapsulating resin for encapsulating surfaces of the
semiconductor chip and the connecting members; and
external electrodes exposed from the encapsulating resin,
wherein
each of the inner leads extends across the periphery of the
30 semiconductor chip from an internal side to an external side of the periphery,
and includes a protruded portion provided on a surface of the inner lead on
an external side relative to the periphery of the semiconductor chip, the
protruded portion being protruded in a thickness direction,
conductive bumps that are formed as the connecting members on the
35 electrodes of the semiconductor chip are connected with internal portions of
the respective inner leads, the internal portions being positioned inward
relative to the protruded portions, and

the external electrodes are formed on surfaces of the protruded portions, and tip ends of the external electrodes are protruded relative to a back face of the semiconductor chip.

5 5. The resin-encapsulated semiconductor device according to claim 4, wherein back faces of the inner leads are positioned substantially in the same plane as that of an external face of the encapsulating resin.

10 6. The resin-encapsulated semiconductor device according to claim 5, wherein external end faces of the inner leads are positioned substantially in the same planes as that of external faces of the encapsulating resin.

15 7. A resin-encapsulated semiconductor device comprising:
a semiconductor chip on a surface of which a group of electrodes is provided;

a plurality of inner leads arranged along a periphery of the semiconductor chip;

connecting members for connecting the electrodes of the semiconductor chip with the respective inner leads;

20 an encapsulating resin for encapsulating surfaces of the semiconductor chip and the connecting members; and

external electrodes exposed from the encapsulating resin,
wherein

25 the semiconductor chip includes a first semiconductor chip and a second semiconductor chip, the second semiconductor chip being smaller in size than the first semiconductor chip and being stacked on a surface of the first semiconductor chip,

30 the first semiconductor chip has a first electrode group composed of electrodes arranged on its peripheral portion, and a second electrode group composed of electrodes arranged in an area inward relative to the first electrode group,

35 each of the inner leads extends across the periphery of the first semiconductor chip from an internal side to an external side of the periphery, and includes a protruded portion provided on a surface of the inner lead on an external side relative to the periphery of the first semiconductor chip, the protruded portion being protruded in a thickness direction,

conducting bumps that are formed as the connecting members on the

electrodes of the first electrode group of the first semiconductor chip are connected with internal portions of the respective inner leads, the internal portions being positioned inward relative to the protruded portions,

the second semiconductor chip is disposed in a region surrounded by

5 internal ends of the inner leads, and is connected electrically with the electrodes of the second electrode group of the first semiconductor chip via conductive bumps,

the encapsulating resin encapsulates surfaces of the first and second semiconductor chips and the conductive bumps, and

10 the external electrodes are formed on surfaces of the protruded portions, and tip ends of the external electrodes are protruded relative to a back face of the first semiconductor chip.

8. The resin-encapsulated semiconductor device according to claim 7,
15 wherein an external face of the encapsulating resin, back faces of the inner leads, and a back face of the second semiconductor chip are positioned substantially in the same plane.

9. The resin-encapsulated semiconductor device according to claim 8,
20 wherein external end faces of the inner leads are positioned substantially in the same planes that contain external faces of the encapsulating resin.

10. The resin-encapsulated semiconductor device according to claim 4 or
7,

25 wherein each of the internal portion of the inner leads is inclined from a back face of the inner lead to protruded side of the protruded portion toward an internal end of the internal portion.

11. A method for producing a resin-encapsulated semiconductor device,
30 comprising:

using a lead frame that includes a frame and a plurality of inner leads that extend inward from the frame, each of the inner leads having a protruded portion provided on a surface of an external side portion thereof, the protruded portion being protruded in a thickness direction, together with
35 a semiconductor chip having a size such that its periphery falls within an area inward relative to the protruded portions of the inner leads, the semiconductor chip having a group of electrodes;

forming conductive bumps on the electrodes of the semiconductor chip;

electrically connecting the electrodes of the semiconductor chip with internal portions of the respective inner leads via the conductive bumps, the internal portions being positioned inward relative to the protruded portions;

5 internal portions being positioned inward relative to the protruded portions;

encapsulating a region including surfaces of the semiconductor chip and the conductive bumps with an encapsulating resin, with the frame and the protruded portions of the inner leads being exposed;

removing the frame from the encapsulated structure; and

10 providing external electrodes on surfaces of the protruded portions so that tip ends of the external electrodes are protruded relative to a back face of the semiconductor chip.

12. A method for producing a resin-encapsulated semiconductor device, comprising:

15 using a lead frame that includes a frame and a plurality of inner leads that extend inward from the frame, each of the inner leads having a protruded portion provided on a surface of an external side portion thereof, the protruded portion being protruded in a thickness direction, together with a first semiconductor chip and a second semiconductor chip, the first semiconductor chip having a first electrode group composed of electrodes arranged in its peripheral portion and a second electrode group composed of electrodes arranged inward relative to the first electrode group, the second semiconductor chip being smaller in size than the first semiconductor chip and having a group of electrodes;

20 forming first conductive bumps on the electrodes of the first electrode group of the first semiconductor chip, and forming second conductive bumps on the electrodes of the second semiconductor chip;

25 stacking the second semiconductor chip on a surface of the first semiconductor chip, and electrically connecting the electrodes of the second electrode group of the first semiconductor chip with the second conductive bumps on the second semiconductor chip;

30 electrically connecting the first conductive bumps with internal portions of the respective inner leads, the internal portions being positioned inward relative to the protruded portions;

35 encapsulating a region including surfaces of the first and second semiconductor chips and the first and second conductive bumps with an

encapsulating resin, with the frame and the protruded portions of the inner leads being exposed;

removing the frame from the encapsulated structure; and

forming external electrodes on surfaces of the protruded portions so

5 that tip ends of the external electrodes are protruded relative to a back face of the first semiconductor chip.

13. The method according to claim 12, further comprising:

grinding a back face of the second semiconductor chip and back faces

10 of the inner leads at the same time, after the encapsulation.